TENSION ADJUSTABLE MEMBRANE OR MESH SEAT ASSEMBLY

CROSS-REFERENCE TO RELATED APPLICATION

[001] This patent application claims the benefit of U.S. Provisional Patent Application serial number 60/404,021, filed on August 16, 2002 and entitled "Tension Adjustable Mesh Seat Assembly."

BACKGROUND OF THE INVENTION

1. Field of the Invention

[002] This invention relates to a seat assembly for a motor vehicle. More particularly, the invention relates to a seat assembly including a tensioning mechanism for adjusting the tension of a trim cover material.

2. Description of Related Art

[003] A motor vehicle includes a plurality of seat assemblies within a passenger compartment for supporting an occupant. The seat assembly includes a seat cushion and a seat back coupled to the seat cushion. A rigid seat frame supports the seat cushion and the seat back. In a so-called mesh seat assembly, a trim cover material, most commonly an elastomer membrane or a mesh suspension, extends in tension over the seat frame to support the occupant. Typically, the tension in the trim cover material may be adjusted to firmly secure the trim cover material to the seat frame. Adjusting the tension in the trim cover material also allows the seat assembly to conform to the body contour of different occupants.

[004] Various mechanisms and systems for adjusting the tension in the trim cover material are known in the art. For example, United States Patent 5,716,096 to Pryde et al. discloses a seat cover assembly including a seat envelope disposed about a seat. The seat envelope includes a drawstring sheath having an enclosed chamber extending along a peripheral edge of the seat envelope. A drawstring having opposing ends is slidably disposed in the chamber of the drawstring sheath. The seat envelope also includes attachment slits spaced apart from the drawstring sheath. The seat includes a retaining device or attachment projections

located along a seat bottom surface. The attachment slits are placed over the attachment projections to secure the seat envelope to the seat. Thereafter, the ends of the drawstring are pulled and cinched in an overlapping fashion to draw the seat envelope tightly against the seat. The ends of the drawstring are then tied to posts on the seat to maintain tension in the cinched drawstring.

[005] United States Patent 4,712,834 to Warwick discloses a seat cushion with tension limiting means. The seat cushion includes opposing side bars each extending between a rear bar and a front bar. A rear plate is disposed adjacent the rear bar, and a front plate extends between the side bars at a point set back from the front bar. A fixed bar extends between the front and rear plates, and a rotatable torsion bar extends between the front and rear plates parallel to the fixed bar. A membrane includes a front edge attached to the front bar, and a rear edge attached to the rear bar. In addition, opposing edges of the membrane extend over the side bars and form elongated loops. An elongated rod extends through each of the elongated loops. A first pair of cables each has one end wound around the torsion bar and another end attached to one of the elongated rods. A second pair of cables each includes one end wound around the torsion bar in the opposite direction as the first pair of cables and another end attached to the other elongated rod. Thus, rotation of the torsion bar in one direction will pull the elongated rods towards one another and increase tension in the membrane, and rotation of the torsion bar in the opposite direction will decrease tension in the membrane.

SUMMARY OF THE INVENTION

[006] A seat assembly for a motor vehicle includes a seat frame having a front member, a rear member, and side members extending between the front and rear members. A trim cover material extends in tension over the seat frame and includes a perimeter edge disposed about the front, rear, and side members thereof. The trim cover material includes a pocket formed along the perimeter edge. A tensioning mechanism includes a cable having a middle portion disposed within the pocket of the trim cover material, and cable ends extending out of the pocket. The tensioning mechanism also includes a tension block having opposing adjustment arms each coupled to one of the cable ends. Movement of the opposing adjustments arms towards and

away from each other selectively adjusts the tension in the trim cover material disposed about the seat frame.

BRIEF DESCRIPTION OF THE DRAWINGS

[007] Advantages of the present invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

Figure 1 is a front view of a seat assembly according to the invention;

Figure 2 is a bottom view of the seat assembly including a cable disposed within a trim cover material;

Figure 3 is an enlarged bottom view of the seat assembly including a tension block having opposing adjustment arms coupled to the cable; and

Figure 4 is an enlarged bottom view similar to Figure 3 in which the adjustment arms have been moved away from each other.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[008] Referring to Figure 1, a seat assembly, generally shown at 10, according to the invention is provided for supporting an occupant within a motor vehicle (not shown). The seat assembly 10 includes a seat cushion 12 and a seat back 14 pivotally coupled to the seat cushion 12 for movement of the seat assembly 10 between a plurality of seating positions. Alternatively, the seat back 14 may be fixedly secured to the seat cushion 12 so that the seat assembly 10 remains in a single generally upright, seating position.

[009] The seat cushion 12 and the seat back 14 each include a rigid seat frame 16. Each seat frame 16 includes generally parallel front 18 and rear 20 members, and side members 22, 24 extending between the front 18 and rear 20 members. Side bolsters 26, 28 are secured to each of the side members 22, 24 to provide additional support for the occupant, particularly during lateral accelerations of the motor vehicle.

[010] A trim cover material 30 extends in tension over the seat frame 16 of each of the seat cushion 12 and the seat back 14. The trim cover material 30 is an elastomer membrane or

mesh suspension, both of which are well-known to those having ordinary skill in the art. The use of the elastomer membrane or mesh suspension provides an air-permeable seat assembly that is resistant to deformation when exposed to different environments and changing weather conditions.

[011] Referring to Figure 2, the trim cover material 30 defines a peripheral edge 32 that extends over and around the front 18 and rear 20 members, and the side members 22, 24 of the seat frame 16. The trim cover material 30 includes a pocket 34 extending along a substantial portion of the peripheral edge 32. The pocket 34 is disposed along a bottom surface 36 of the seat frame 16. The pocket 34 includes pocket ends 38, 40, and an opening 42 at each of the pocket ends 38, 40.

[012] A tensioning mechanism, generally indicated at 44, selectively adjusts the tension in the trim cover material 30. The tensioning mechanism 44 includes a cable 46 slidably disposed within the pocket 34. The cable 46 includes a middle portion 48 extending between cable ends 50, 52. The middle portion 48 is disposed within the pocket 34 and extends along a substantial portion of the peripheral edge 32 of the trim cover material 30. The cable ends 50, 52 extend out of the openings 42 of the pocket 34 at the respective pocket ends 38, 40. The pocket 34 includes a plurality of slits 51 along the peripheral edge 32 of the trim cover material 30 for accessing the middle portion 48 of the cable 46.

[013] Referring to Figure 3, the tensioning mechanism 44 also includes a tension block, generally indicated at 54, coupled to the cable ends 50, 52 for tensioning the cable 46. In a preferred embodiment, the tension block 54 is free-floating, e.g., the tension block 54 is not secured to any part of the seat assembly 10. It is, however, contemplated that the tension block 54 may be fixedly attached to part of the seat assembly 10 in order to gain leverage during tensioning of the cable 46.

[014] The tension block 54 includes a body portion 56 extending between first 58 and second 60 ends. The body portion 56 includes oppositely facing threaded bores 62, 64 at the

respective first 58 and second 60 ends. The threaded bores 62, 64 are aligned axially to each other.

[015] The tension block 54 also includes opposing adjustment arms 66, 68 extending out from the first 58 and second 60 ends of the body portion 56. Each of the adjustment arms 66, 68 includes a threaded shaft 70 rotatably engaging the threaded bores 62, 64 at the first 58 and second 60 ends of the body portion 56. Rotation of the adjustment arms 66, 68 in a tightening direction moves the adjustment arms 66, 68 towards the body portion 56, and rotation of the adjustment arms 66, 68 in a loosening direction moves the adjustment arms 66, 68 away from the body portion 56.

[016] Each of the adjustment arms 66, 68 also includes a hook 72 for coupling the tension block 54 to the cable ends 50, 52. A knob or handle (neither shown) may be operatively connected to the hooks 72 for facilitating rotation of the adjustment arms 66, 68 in the tightening and loosening directions. It will, however, be appreciated that although a hook is shown coupled to the cable ends 50, 52, the adjustment arms 66, 68 could include any of numerous coupling devices for coupling the tension block 54 to the cable ends 50, 52.

[017] The rotation of the adjustment arms 66, 68 relative to the body portion 56 adjusts the tension in the cable 46 by changing the overall effective length of the cable 46, which in turn adjusts the tension in the trim cover material 30. Specifically, rotation of the adjustment arms 66, 68 in the tightening direction causes the adjustment arms 66, 68 to move towards each other. The movement of the adjustment arms 66, 68 towards each other shortens the length of the cable 46 and increases the tension in the cable 46 as the cable ends 50, 52 are drawn inwardly towards the body portion 56. As a result, the peripheral edge 32 of the trim cover material 30 is tightly fitted around the seat frame 16 and the tension in the trim cover material 30 is increased.

[018] On the other hand, rotation of the adjustment arms 66, 68 in the loosening direction causes the adjustment arms 66, 68 to move away from each other. The movement of the adjustment arms 66, 68 away from each other lengthens the cable 46 and decreases the tension in the cable 46 as the cable ends 50, 52 are displaced outwardly away from the body

portion 56. As a result, the peripheral edge 32 of the trim cover material 30 loosens around the seat frame 16 and the tension in the trim cover material 30 is decreased.

[019] The tensioning mechanism 44 adjusts the tension in the trim cover material 30 so that the trim cover material 30 may be easily secured to and removed from the seat frame 16. In addition, tension adjustment of the trim cover material 30 allows the seat assembly 10 to conform to a body contour of different occupants.

[020] The invention has been described in an illustrative manner. It is to be understood that the terminology, which has been used, is intended to be in the nature of words of description rather than of limitation. Many modifications and variations of the invention are possible in light of the above teachings. Therefore, within the scope of the appended claims, the invention may be practiced other than as specifically described.